December 17, 2001

Mr. James Alexander
U.S. Steel - Gary Works - Synthetic Fuel Plant
One North Broadway Street
Gary, IN 46402

Dear Mr. Alexander:

Re: Exempt Construction Status,
089-14692-00121

The application from U.S. Steel - Gary Works - for the construction of Synthetic Fuel Plant, received on July 25, 2001, has been reviewed. Based on the data submitted and the provisions in 326 IAC 2-1.1-3, it has been determined that the following synthetic fuel plant, to be located at One North Broadway Street, Gary, Indiana, is classified as exempt from air pollution permit requirements:

(a) One (1) enclosed coal blending unit where 500 tons per hour of coal is mixed with a binding agent venting to the atmosphere.

(b) One (1) covered coal conveyance system with ten (10) transfer points venting to the atmosphere.

The following conditions shall be applicable:

(1) Coal blending and conveyance are to be enclosed to control fugitive emissions.

(2) The facility shall not process more than 500 tons per hour of coal.

(3) Pursuant to 326 IAC 5-1-2 (Opacity Limitations) except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following stringent opacity limitations as Gary, Indiana is in the section of Lake County where the more stringent standards apply:

(a) Opacity shall not exceed an average of twenty percent (20%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of 15 minutes (60 readings) in a 6-hour period as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuos opacity monitor in a six (6) hour period.

(4) Pursuant to 326 IAC 6-1-2 (a) (Nonattainment Areas Particulate Emission Limitations for General Sources), this facility shall not emit particulate matter in excess of 0.03 grains per dry standard cubic feet. Compliance with this limit also makes 326 IAC 2-3 (Emission Offset) not applicable.

(5) Pursuant to 326 IAC 6-1-11.1 (Lake County Fugitive Dust Limits), the particulate matter emissions from source wide activities shall meet the following requirements:

(a) The average instantaneous opacity of fugitive particulate emissions from a paved road shall not exceed ten percent (10%).

(b) The average instantaneous opacity of fugitive particulate emissions from an unpaved road shall not exceed ten percent (10%).

(c) The average instantaneous opacity of fugitive particulate emissions from batch transfer shall not exceed ten percent (10%).

(d) The opacity of fugitive particulate emissions from continuous transfer of material onto and out of storage piles shall not exceed ten percent (10%) on a three (3) minute average.

(e) The opacity of fugitive particulate emissions from storage piles shall not exceed ten percent (10%) on a six (6) minute average.

(f) There shall be a zero (0) percent frequency of visible emission observations of a material during the inplant transportation of material by truck or rail at any time.

(g) The opacity of fugitive particulate emissions from the inplant transportation of material by front end loaders and skip hoists shall not exceed ten percent (10%).

(h) There shall be a zero (0) percent frequency of visible emission observations from a building enclosing all or part of the material processing equipment, except from a vent in the building.

(i) The PM_{10} emissions from building vents shall not exceed twenty-two thousandths (0.022) grains per dry standard cubic foot and ten percent (10%) opacity.

(j) The opacity of particulate emissions from dust handling equipment shall not exceed ten percent (10%).

(k) Any facility or operation not specified in 326 IAC 6-1-11.1(d) shall meet a twenty percent (20%), three (3) minute average opacity standard.

The Permittee shall achieve these limits by controlling fugitive particulate matter emissions according to the Fugitive Dust Control Plan.

(6) Pursuant to 40 CFR Part 60.250 Subpart Y, this synthetic fuel plant is subject to the new source performance standard (NSPS) (326 IAC and 40 CFR Part 60.250 (Subpart Y) - Coal Preparation Plants. The provisions of this rule applies to coal processing and conveying equipment, which was constructed after October 24, 1974 and processes more than 200 tons of coal per day. The U.S. Steel synthetic fuel plan will process and convey 12,000 tons of coal per day. Although the emissions from this source or at exemption levels, it processes enough coal to be subject to this rule.

The operator of such a facility must comply with all testing requirements in the rule, and shall not discharge into the atmosphere from any coal processing and conveying equipment gases which exhibit 20% opacity or greater.

(7) The facility will need to record monthly coal transferred to insure that the plant handles no more than 500 tons per hour of coal to insure the facility maintains exemption status.

Until the plant's contractor has been selected, the facility is considered part of the U.S. Steel Gary Works Part 70 permit. Once the plant has been transferred to an on-site contractor as U.S. Steel intends, the contractor may be issued a separate Part 70 permit prior to operation. IDEM must be informed when a contractor is selected.

An application or notification shall be submitted in accordance with 326 IAC 2 to the Office of Air Quality (OAQ) if the source proposes to construct new emission units, modify existing emission units, or otherwise modify the source.

Sincerely,

Original Signed by Paul Dubenetzky
Paul Dubenetzky, Chief
Permits Branch
Office of Air Quality

ERG/RB

cc: File - Lake County
Lake County Health Department
Northwest Regional Office
Air Compliance - Ramesh Tejuja
Permit Tracking - Sara Cloe
Technical Support and Modeling - Michele Boner
Compliance Branch - Karen Nowak
TV Permit File # 089-7663-00121

Indiana Department of Environmental Management
Office of Air Quality

Technical Support Document (TSD) for a Exempted Unit

Source Background and Description

Source Name: U.S. Steel - Gary Works - Synthetic Fuel Plant
Source Location: One North Broadway Street, Gary, IN 46402
County: Lake
SIC Code: 4953
Operation Permit No.: 089-14692-00121
Permit Reviewer: ERG/RB

The Office of Air Quality (OAQ) has reviewed an application from U.S. Steel - Gary Works - Synthetic Fuel Plant relating to the construction and operation of the coal binding and conveyance unit.

This synthetic fuel plant is considered to be part of the U.S. Steel-Gary Works and subject to U.S. Steel's Part 70 permit. If U.S. Steel decided to designate an on-site contractor for the construction and operation of this plant, then on-site contractor will be required to submit a Part 70 permit application.

New Emission Units and Pollution Control Equipment Receiving Prior Approval

(a) One (1) enclosed coal blending unit where 500 tons per hour of coal is mixed with a binding agent venting to the atmosphere.

(b) One (1) covered coal conveyance system with ten (10) transfer points venting to the atmosphere.

Unpermitted Emission Units and Pollution Control Equipment

There are no unpermitted facilities operating at this source during this review process.

Existing Approvals

U.S. Steel's Gary Works has applied for a Title V permit. U.S. Steel indicated that this synthetic fuel facility will be constructed and operated by an on-site constructor who will then get a separate Title V permit in order to operate the coal blending and conveyance operation, but until an official contractor is selected, this fuel plant will be incorporated into the U.S. Steel Part 70 permit.

Enforcement Issue

There are no enforcement actions pending on this synthetic fuel plant.

Recommendation

The staff recommends to the Commissioner that the construction and operation be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

A complete application for the purposes of this review was received on July 25, 2001

Emission Calculations

The calculations for the coal blending and conveyance operation submitted by the applicant have been verified and found to be accurate and correct. These calculations are provided in Appendix A of this document.

Potential To Emit Before Controls

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, the department, or the appropriate local air pollution control agency."

Pollutant	Potential To Emit (tons/year)
PM	5.74
PM-10	2.71
SO_2	0
VOC	0
CO	0
NO_x	0

The potential to emit (as defined in 326 IAC 2-7-1(29)) of pollutants is less than the levels listed in 326 IAC 2-1.1-3(d)(1), therefore, synthetic fuel plant is subject to the provisions of 326 IAC 2-1.1-3.

County Attainment Status

The source is located in Lake County.

Pollutant	Status
PM-10	Moderate
SO_2	Primary
Ozone	Severe
CO	Maintenance
Lead	Attainment

(a) Volatile organic compounds (VOC) are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Lake County has been designated as nonattainment for ozone.

VOC emissions were reviewed pursuant to the requirements for Emission Offset, 326 IAC 2-3.

(b) Lake County has also been classified as non-attainment for sulfur dioxide (SO_2) and particulate matter less than 10 microns in diameter (PM-10). Therefore, these emissions were reviewed pursuant to the requirements for Emission Offset, 326 IAC 2-3.

(c) Lake County has been classified as attainment for carbon monoxide (CO) and oxides of nitrogen (NOx). Therefore, CO and NOx emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

Source Status

(a) U.S. Steel-Garry Works is a major stationary source because it is in one of the 28 listed source categories and at least one regulated pollutant is emitted at a rate of 100 ton per year or more.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)

This source is considered part of U.S. Steel-Gary Works and will be incorporated in the U.S. Steel-Gary Work's Part 70 (Title V) permit. If in the future the operation is transferred to an on-site contractor, the contractor shall be provided a separate Part 70 (Title V) operating permit at that time.

Federal Rule Applicability

(a) This synthetic fuel plant is subject to the new source performance standard (NSPS) (326 IAC and 40 CFR Part 60.250 (Subpart Y) - Coal Preparation Plants. The provisions of this rule applies to coal processing and conveying equipment, which was constructed after October 24, 1974 and processes more than 200 tons of coal per day. The U.S. Steel synthetic fuel plan will process and convey 12,000 tons of coal per day.

The operator of such a facility must comply with all testing requirements in the rule, and shall not discharge into the atmosphere from any coal processing and conveying equipment gases which exhibit 20% opacity or greater.

(b) There are no National Emission Standards for Hazardous Air Pollutants (NESHAPs)(326 IAC 14 and 40 CFR Part 63) applicable to this source.

State Rule Applicability - Entire Source

326 IAC 2-6 (Emission Reporting)

This synthetic fuel plant is subject to 326 IAC 2-6 (Emission Reporting), because it is considered part of U.S. Steel - Gary Works. Pursuant to this rule, the owner/operator of the source must annually submit an emission statement for the source. The annual statement must be received by April 15 of each year and contain the minimum requirement as specified in 326 IAC 2-6-4. The submittal should cover the period defined in 326 IAC 2-6-2(8)(Emission Statement Operating Year).

326 IAC 5-1 (Opacity Limitations)

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following more stringent opacity limitations as Gary, Indiana is in the portion of the Lake County where the more stringent standards apply, unless otherwise stated in this permit:

(a) Opacity shall not exceed an average of twenty percent (20%) any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings) as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

State Rule Applicability - Individual Facilities

326 IAC 2-4.1 (Major Sources of Hazardous Air Pollutants (HAP))

The operation of coal blending and conveyance will emit less than 10 tons per year of a single HAP or 25 tons per year of a combination of HAPs. Therefore, 326 IAC 2-4.1 does not apply.

326 IAC 8-1-6 (New Facilities - General Reduction Requirement)

This synthetic fuel plant does not have potential VOC emissions equal to or greater than twenty five (25) tons per year, therefore this source is not subject to the provisions of 326 IAC 8-1-6.

326 IAC 6-1-2 (a) (Nonattainment Areas Particulate Emission Limitations for General Sources)

This rule applies to PM emission sources that have potential to emit one hundred (100) tons or more PM per year or have actual emission of ten (10) tons or more of PM per year. U.S. Steel-Gary Works has the potential to emit more than 100 tons per year of PM, therefore 326 IAC 6-1-2 applies. Pursuant to 326 IAC 6-1-2(a), this facility shall not emit particulate matter in excess of 0.03 grains per dry standard cubic feet.

326 IAC 6-1-10 (Lake County PM_{10} Emission Requirements)

This rule provides specific limitations for individual emission units at U.S. Steel-Gary Works, as the synthetic fuel plant has not been constructed, it is not included in the list of U.S. Steels' emission sources.

326 IAC 6-1-11.1 (Lake County Fugitive Dust Limits)

This rule applies to facilities that have a potential to emit five (5) or more tons per year of fugitive particulate matter into the atmosphere of Lake County or sources that are specifically listed in the rule. U.S. Steel is one of the sources specifically listed, therefore this rule applies to the particulate matter emissions from source wide activities shall meet the following requirements:

(a) The average instantaneous opacity of fugitive particulate emissions from a paved road shall not exceed ten percent (10%).

(b) The average instantaneous opacity of fugitive particulate emissions from an unpaved road shall not exceed ten percent (10%).

(c) The average instantaneous opacity of fugitive particulate emissions from batch transfer shall not exceed ten percent (10%).

(d) The opacity of fugitive particulate emissions from continuous transfer of material onto and out of storage piles shall not exceed ten percent (10%) on a three (3) minute average.

(e) The opacity of fugitive particulate emissions from storage piles shall not exceed ten percent (10%) on a six (6) minute average.

(f) There shall be a zero (0) percent frequency of visible emission observations of a material during the inplant transportation of material by truck or rail at any time.

(g) The opacity of fugitive particulate emissions from the inplant transportation of material by front end loaders and skip hoists shall not exceed ten percent (10%).

(h) There shall be a zero (0) percent frequency of visible emission observations from a building enclosing all or part of the material processing equipment, except from a vent in the building.

(i) The PM_{10} emissions from building vents shall not exceed twenty-two thousandths (0.022) grains per dry standard cubic foot and ten percent (10%) opacity.

(j) The opacity of particulate emissions from dust handling equipment shall not exceed ten percent (10%).

(k) Any facility or operation not specified in 326 IAC 6-1-11.1(d) shall meet a twenty percent (20%), three (3) minute average opacity standard submitted on November 8, 2001.

The Permittee shall achieve these limits by controlling fugitive particulate matter emissions according to the Fugitive Dust Control Plan.

Conclusion

The construction and operation of this synthetic fuel plant shall be subject to the conditions of the attached proposed Exemption 089-14692-00121.

Estimate Particulate Matter Emissions from Materials Handling Operations

From EPA's AP-42 Compilations of Emission Factors Section 11.2.3, the predictive equation for estimating emissions of particulate matter from materials handling transfer points where aggregate materials are dropped through air and exposed to horizontal wind shear is.

$$E = k(0.0032)\left[\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}\right]$$

Where:

Particulate matter emission factor~pounds of particulate matter per ton of material per transfer point.

Particle size multiplier:
0.74 for total particulate matter (PM)
0.35 for particulate matter less then 10 microns in aerodynamic diameter (PM10).

Wind velocity~miles per hour

Material moisture content~percent by weight.

Because transfer points will be enclosed, assume that air current velocities inside of enclosures are 150 feet per minute (1.7mph).

The worst possible case is that no binder is applied to the coal blend as it is moved through the new materials handling system.

Let:

$U = 1.7\text{mph}$

$M = 6\%\ H_2O$

$$E_{TSP} = 0.74[0.0032]\left[\frac{\left(\frac{1.7}{5}\right)^{1.3}}{\quad}\right.$$

$$E_{TSP} = \frac{0.0001251\dfrac{\text{lbs coal}}{\text{tons coal}}}{\text{transfer point}}$$

$$E_{PM10} = \frac{0.35}{0.74} \times 0.0001251$$

$$E_{PM10} = \frac{0.00005918\dfrac{\text{lbs } PM_{10}}{\text{tons coal}}}{\text{transfer point}}$$

PM Emissions:

$$\frac{0.0001251 \text{ lbs PM}}{\text{ton coal} - \text{transfer point}} \times 10 \text{ transfer point} = \frac{0.001251 \text{ lbs PM}}{\text{ton Coal}}$$

$$\frac{0.001251 \text{ lbs PM}}{\text{ton coal}} \times \frac{500 \text{ tons coal}}{\text{hr}} = \frac{0.6256 \text{ lbs PM}}{}$$

$$\frac{0.6256 \text{ lbs PM}}{\text{hr}} \times \frac{24 \text{ hrs}}{\text{day}} = \frac{15.01 \text{ lbs PM}}{}$$

$$\frac{0.6256 \text{ lbs PM}}{\text{hr}} \times \frac{8{,}760 \text{ hrs}}{\text{yr}} \times \frac{1 \text{ ton PM}}{} = \frac{2.74 \text{ tons PM}}{}$$

PM_{10} Emissions:

$$\frac{0.00005918 \text{ lbs } PM_{10}}{\text{ton coal} - \text{transfer point}} \times 10 \text{ transfer points} \times \frac{500 \text{ tons coal}}{} = \frac{0.2959 \text{ lbs } PM_{10}}{\text{hr}}$$

$$\frac{0.2959 \text{ lbs } PM_{10}}{\text{hr}} \times \frac{24 \text{ hrs}}{\text{day}} = \frac{7.10 \text{ lbs } PM_{10}}{\text{day}}$$

$$\frac{0.2959 \text{ lbs } PM_{10}}{\text{hr}} \times \frac{8{,}760 \text{ hrs}}{\text{yr}} \times \frac{1 \text{ ton } PM_{10}}{2{,}000 \text{ lbs } PM_{10}} = \frac{1.29 \text{ tons } PM_{10}}{\text{yr}}$$

The worst possible case (no solution application) results in TSP and PM_{10} emissions below thresholds that would require a major modification permit.

U.S. STEEL - GARY WORKS
GARY COKE OPERATIONS
SUPPLEMENTAL CALCULATION OF PARTICULATE MATTER EMISSION RATES
EMISSIONS FROM COAL/BINDER BLENDING

Givens:

1 Binder will be added to the coal using a pug mill type blender.

2. The blending apparatus will be an enclosed device with removable covers on access openings for inspection and maintenance.

3. The blending device will be housed in a building

4. Previously submitted calculations for particulate matter emissions from all materials handling transfer points yielded the following results.

PM Emissions: 2.74 tons PM/yr
PM_{10} Emissions: 1.29 tons PM_{10}/yr

Assumptions:

1 There are no published EPA emission factors for the blending of coal with a binder in a pug mill device. Use the aggregate drop equation and adjust air current velocity for the anticipated rotational velocity of the blender screw (assuming rotational velocity of 60 rpm for a 5-foot diameter paddle wheel).

2 The blender will be totally enclosed. Assume a 99 percent enclosure efficiency (i.e., assuming one percent of the airborne dust generated by the agitation of the blending process escapes the enclosure into the building interior).

3 Conservatively, neglect the dust suppression effect of adding the binder to the coal.

4. Use the nominal coal moisture of 6% wt/wt as used in previous calculations.

5. Assume building containment efficiency of 70%.

Translational Speed of Blender Blade Tips:

$$\frac{60\,\text{rev}}{\text{min}} \times \frac{2\,\Pi\,\text{r ft}}{\text{rev}} = 60 \times 2\,\Pi(2.5) = 942.5\,\text{ft/min}$$

$$\frac{942.5\,\text{ft}}{\text{min}} \times \frac{1\,\text{mile}}{5{,}280\,\text{ft}} \times \frac{60\,\text{min}}{\text{hr}} = 10.71\,\text{mph}$$

PM Emissions:

$$E_{PM} = k(0.0032)\left[\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}\right.$$

$k = 0.74$ for PM

$$E_{PM} = 0.74(0.0032)\left[\frac{\left(\frac{10.71}{5}\right)^{1.3}}{\left(\frac{6}{2}\right)^{1.4}}\right.$$

$$E_{PM} = 0.00137\,\text{lbs PM/ton coal}$$

Emissions Generated Inside Blender Enclosure:

$$\frac{0.00137\,\text{lbs PM}}{\text{ton coal}} \times \frac{500\,\text{tons coal}}{\text{hr}} \times \frac{8{,}760\,\text{hrs}}{\text{yr}} \times \frac{1\,\text{ton PM}}{2{,}000\,\text{lbs PM}} = 3.00\,\text{tons PM/yr}$$

Emissions to Building Interior:

$$(1 - 0.99)(3.00) = 0.03\,\text{tons PM/yr}$$

Emissions to Atmosphere:

$$(1 - 0.70)(0.03) = \underline{0.009\,\text{tons PM/yr}}$$

PM_{10} Emissions:

$$k = 0.35 \text{ for } PM_{10}$$

$$E_{PM10} = \frac{0.35}{0.74} \times 3.00 = 1.42 \text{ tons } PM_{10}/yr$$

Emissions to Building Interior:

$$(1 - 0.99)(1.42) = 0.014 \text{ tons } PM_{10}/yr$$

Emissions to Atmosphere:

$$(1 - 0.70)(0.014) = 0.004 \text{ tons } PM_{10}/yr$$

Summary of Calculations:

	Estimated Emissions to Atmosphere - tons/yr	
	PM	**PM_{10}**
Blending Operation	0.009	0.004
Materials Handling	+ 2.74	+ 1.29
Total Emissions	2.75	1.29

Total emissions are below the exemption levels.